**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| Application No.: 10/574,027 | Examiner: Aaron Robert Eastman |
| Applicants/Appellants: Stones et al. | Art Unit: 3745 |
| Title: VACUUM PUMP | Confirmation No.: 8027 |
| Filed: March 23, 2006 | |
| Atty. Docket No.: M03B197 | |

Commissioner for Patents
MAIL STOP ****APPEAL BRIEF - PATENTS****
P.O. Box 1450
Alexandria, VA 22313-1450

**APPEAL BRIEF**

Dear Sir/Madam:

Appellants submit herewith an Appeal Brief in the above-referenced matter under 37 CFR 41.37.

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## I. STATEMENT OF THE REAL PARTY IN INTEREST

The real party in interest is Edwards Limited, an English company of Manor Royal Crawley, West Sussex, RH10 9LW, United Kingdom, and is the assignee of record of the subject application.

## II. RELATED APPEALS AND INTERFERENCES

Appellants are not aware of any related appeals, judicial proceedings or interferences that may be related to, directly affect, be directly affected by, or have a bearing on the Board's decision on this appeal.

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## III. STATUS OF CLAIMS

Claims 48-64 are pending in the application. Claims 1-47 have been cancelled. Claims 48-64 stand rejected by the Examiner, and are the claims on appeal.

## IV. STATUS OF AMENDMENTS

No amendment has been filed subsequent to the Final Office Action dated January 22, 2010.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 48 is directed to a compound multi-port vacuum pump comprising first, second and third pumping sections *(e.g., FIG. 2, numbers 106, 108, and 112, respectively; the specification, page 9, line 5)*, a first pump inlet *(120)* through which fluid can enter the pump and pass through each of the pumping sections *(106, 108,*

*and 112)* towards a pump outlet *(e.g., the specification, page 10, lines 26-29)*, a second pump inlet *(122)* through which fluid can enter the pump and pass through only the second and third pumping sections *(108 and 112)* towards the outlet *(e.g., the specification, page 10, lines 29-32)*, an optional third pump inlet *(126)* through which fluid can enter the pump and pass through only the third pumping section *(112)* towards the outlet *(e.g., the specification, page 11, lines 3-5)*, and a fourth inlet *(124)* through which fluid can enter the pump and pass through only part of the third pumping section *(112)* towards the outlet *(e.g., the specification, page 10 line 32 – page 11 lines 2)*. FIG. 2 of the application is hereto attached below for easy reference.

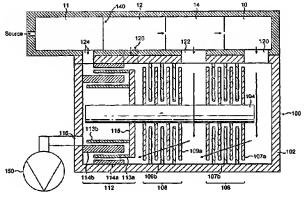


FIG. 2

Conventionally, each of the inlets of a multi-port vacuum pump is disposed in a manner such that gas entering the inlet flows through at least an entire pumping section of the pump. As shown in FIG. 1 of the application hereto attached below, fluid entering inlet 24 flows through pumping sections 18, 20, and 22 in their entirety. Fluid entering inlet 26 flows through pumping sections 20 and 22 in their entirety. Fluid entering inlet 27 flows through pumping section 22 in its entirety. It is common that in such

arrangement, backing pump 32 evacuates chamber 11 via a direction conduit there between to ensure that gas entering inlets 24, 26, and 27 are at sufficiently low pressure levels.

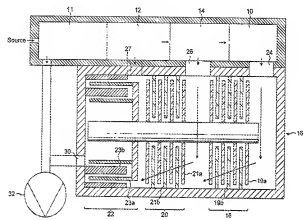


FIG. 1 (PRIOR ART)

Comparing FIG. 2 to FIG. 1, the claimed invention is able to eliminate a fluid path that would otherwise exist directly between chamber 11 and backing pump 150 by incorporating "a fourth inlet through which fluid can enter the pump and pass through only part of the third pumping section towards the outlet." One advantage of the invention is that, by enabling the fluid to be directly pumped by the compound multi-port vacuum pump 100, instead of the backing pump 150, the pump 100 can manage more than 99% of the total fluid flow without increasing the size of the backing pump 150. *See, the specification, page 11, lines 14-22.*

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether Examiner errs in rejecting claims 48-64 under 35 USC 103(a), as being unpatentable over US Patent No. 5,733,104 to Conrad et al. (hereinafter referred to as

"Conrad") in view of US Patent No. 5,695,316 to Schutz et al. (hereinafter referred to as "Schutz").

## VII. ARGUMENT

***1. Neither Conrad nor Schutz teaches the claim limitation "a fourth inlet through which fluid can enter the pump and pass through only part of the third pumping section towards the outlet."***

Examiner acknowledges "Conrad et al. do not disclose a fourth inlet through which fluid can enter the pump and pass through only part of the third pumping section towards the outlet." *See, the Final Office Action, page 3, paragraph 5.* It is also acknowledged that "Examiner does not cit Schutz et al. as disclosing a pump having an inlet through which gas passes only part of it." *See, the Final Office Action, page 2, paragraph 1.* Thus, the combination of Conrad and Schutz, without modification, does not teach the claim limitation "a fourth inlet through which fluid can enter the pump and pass through only part of the third pumping section towards the outlet."

***2. There is no suggestion or motivation to modify Conrad and Schutz as Examiner suggests.***

Examiner asserts "it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Conrad et al. by adding Gaede pump section in combination with and immediately downstream of the Holweck pump to create a pumping section as taught in Schutz et al. for the purposes of increasing pump effectiveness. This results in a fourth inlet (17) through which fluid can enter the pump and pass through only part (the Gaede pump portion) of the third pumping section

towards the outlet." *See, the Final Office Action, page 3, paragraph 7.* The drawing below shows a modification of Conrad, visualizing Examiner's proposed modification. In the drawing, a Gaede pump illustrated by dotted lines, such as one taught by Schutz, is added between pump unit 4 and dry pump 8. The suction connection 9 at the inlet of dry pump 8 is altered and reconnected to the middle of the Gaede pump, such that gas entering the Gaede pump through the altered suction connection 9 flows through only part of the pump.

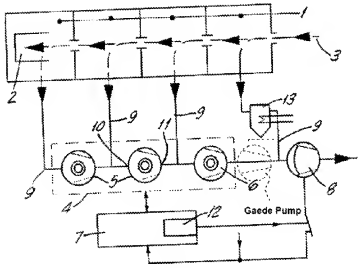


Fig. 2

It is Appellants' contention that Examiner has not met his burden of establishing a prima facie case of obviousness. To establish a prima facie case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references. *In re Vaeck, 947 F.2d 488 (Fed. Cir. 1991).* Examiner has not shown any suggestion or motivation in the cited references to make the proposed modification. Neither is Examiner's proposed modification generally known to a person of ordinary skill in the

art. It is Appellants' understanding that conventional multi-port vacuum pumps arrange the gas inlets and outlets in a way that gas would run through an entire stage from the inlet to the outlet. *See, the specification, page 2, lines 10-14 and FIG. 1.* This is also true when a backing pump is used to support the multi-port vacuum pump. *See, the specification, page 2, lines 14-22.*

***3. The proposed modification changes the operation principle of Conrad, and therefore is not obvious.***

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti, 270 F.2d 810 (CCPA 1959).* Conrad is about a multi-stage vacuum pump that can be mathematically modelled for improved operational control. One of the premises of the mathematical modeling is that all the suction connections are placed between individual stages. For example, Conrad's objective is achieved by "providing a vacuum pump system…, in which the suction connections, provided between the individual stages, are dimensioned and arranged as a function of the pressure relationships…" *See, col. 1, lines 54-64.* The emphasis that the suction connections must be made between individual stages is repeated through out Conrad. For example, Conrad teaches "suction or low pressure connections 9 are placed between the individual stages…" *See, col. 5, lines 59-62.* Changing the location of suction connection to the middle of a Gaede pump in order to run fluid partially through the pump would distort the mathematical model expressed by equations (1)-(6) in Conrad. As a result, it would make the bulk of Conrad's teaching

inapplicable in dimensioning multi-stage pumps. Thus, Appellants respectfully submit that Examiner's proposed modification would change the operation principle of Conrad, and therefore is not obvious.

***4. Conclusion***

Appellants respectfully submit that the Examiner is incorrect in his rejections of the pending claims, and that all the pending claims are drawn to a novel subject matter, patentably distinguishable over the prior art of record. Accordingly, Appellants respectfully request that the Appeal be granted and the Examiner reversed.

Respectfully submitted,

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## VIII. CLAIMS APPENDIX

Claims 1-47 (Cancelled)

48. (Original) A compound multi-port vacuum pump comprising first, second and third pumping sections, a first pump inlet through which fluid can enter the pump and pass through each of the pumping sections towards a pump outlet, a second pump inlet through which fluid can enter the pump and pass through only the second and third pumping sections towards the outlet, an optional third pump inlet through which fluid can enter the pump and pass through only the third pumping section towards the outlet, and a fourth inlet through which fluid can enter the pump and pass through only part of the third pumping section towards the outlet.

49. (Previously Presented) The pump according to claim 48 wherein at least one of the first and second pumping sections comprises at least one turbo-molecular stage.

50. (Previously Presented) The pump according to claim 48 wherein both of the first and second pumping sections comprises at least one turbo-molecular stage.

51. (Previously Presented) The pump according to claim 48 wherein the third pumping section is positioned relative to the second and forth pump inlets such that fluid passing therethrough from the second pump inlet follows a different path from fluid passing therethrough from the fourth pump inlet.

52. (Previously Presented) The pump according to claim 51 wherein the third pumping section is positioned relative to the second and forth pump inlets such that fluid passing therethrough from the forth pump inlet follows only part of the path of the fluid passing therethrough from the second pump inlet.

53. (Previously Presented) The pump according to claim 48 wherein the third pumping section comprises at least one molecular drag stage.

54. (Previously Presented) The pump according to claim 53 wherein the third pumping section comprises a multi-stage Holweck mechanism with a plurality of channels arranged as a plurality of helixes.

55. (Previously Presented) The pump according to claim 54 wherein the Holweck mechanism is positioned relative to the second and forth pump inlets such that fluid passing therethrough from the forth pump inlet follows only part of the path of the fluid passing therethrough from the second pump inlet.

56. (Previously Presented) The pump according to claim 48 wherein the fluid pumping section comprises at least one Gaede pumping stage and/or at least one aerodynamic pumping stage.

57. (Previously Presented) The pump according to claim 54 wherein the third pumping section comprises at least one Gaede pumping stage and/or at least one aerodynamic pumping stage, and wherein the Holweck mechanism is positioned upstream from said at least one Gaede pumping stage and/or at least one aerodynamic pumping stage.

58. (Previously Presented) The pump according to claim 57 wherein the Holweck mechanism is positioned relative to the second and fourth pump inlets such that fluid entering the pump from the fourth pump inlet does not pass therethrough.

59. (Previously Presented) The pump according to claim 56 wherein said at least one aerodynamic pumping stage comprises at least one regenerative stage.

60. (Previously Presented) The pump according to claim 57 wherein the third pumping section comprises at least one aerodynamic pumping stage and wherein, in use, the pressure of the fluid exhaust from the pump outlet is equal to or greater than 10 mbar.

61. (Previously Presented) The pump according to claim 60 wherein the third inlet is positioned such that fluid entering the pump therethrough passes through, of said sections, only the third pumping section towards the pump outlet.

62. (Previously Presented) The pump according to claim 61 wherein the fluid entering the pump through the third inlet passes through a greater number of stages of the third pumping section than fluid entering the pump through the fourth inlet.

63. (Previously Presented) The pump according to claim 48 comprising a drive shaft having mounted thereon at least one rotor element for each of the pumping section.

64. (Previously Presented) The differentially pumped vacuum system comprising a plurality of chambers and a pump according to claim 48 for evacuating each of the chambers.

## IX. EVIDENCE APPENDIX

Following referenced are relied upon by the Examiner in rejecting the claims of the present application, and cited in this Appeal Brief. Copies of the references are separately attached to this Appeal Brief.

1. US Patent No. 5,733,104 to Conrad et al. is relied upon by Examiner in the Final Office Action of January 22, 2010.
2. US Patent No. 5,695,316 to Schutz et al. is relied upon by Examiner in the Final Office Action of January 22, 2010.

## X. RELATED PROCEEDINGS APPENDIX

None